heath
wiechman

on ~~EXERCISE~~ MOVEMENT [=Health] Pt. I

What sort of exercise is best?

As always, the answer depends.

If you exercise solely to look good then the Arnold Schwarzenegger style of weightlifting is right up your alley. However, if you exercise to enhance your health, you should start by exercising a change in your thinking.

In modern times thinking of exercise in the traditional sense amounts to an uninformed view. A better way to phrase the question of exercise is: what are the ways in which I should move? The reason for this shift in perception becomes clear when we consider exercise in a greater context as defined by the late Dr. Ida Rolf:

"In an organic world, there is no such thing as complete lack of movement" and "While it is alive, no human or animal body is ever completely still."[1]

The ultimate context of life is never-ending movement. Rather than thinking about specific exercises as ways of making us fit and strong (or any other outcome you seek to achieve), we are better served, as far as health is concerned, by perceiving all manner of exercise as movements that aim to enhance the way we move within the ultimate context of continual movement. Exercise as movement within movement.

The question becomes how can I exercise in order to enhance the way I move about daily life. Thus a workout becomes highly subjective as the definition of "daily life" differs for all of us. In short, it is context dependent.

We will struggle to answer our newly discovered question unless we begin to understand what healthy movement of the human body means in the greater context of life. In order to build such an understanding we must address a few fundamental qualities of both man and his environment to start to construct a framework for movement.

Let's start by easing off with a little bit of trivia that'll highlight the importance of movement. A recent study evaluating the importance of exercise in cardiovascular health suggests that you are in fact better off to smoke and be physically active than you are to abstain from smoking and lead a sedentary lifestyle.[2] Hopefully that's sufficient enough to establish the power of movement.

How is it possible to evaluate health? You can probably answer that question several different ways, but we'll start by considering the definition of a word that most of us in our misunderstanding unfairly blame for our expanding waist lines: metabolism.

The Oxford Concise Colour Medical Dictionary defines metabolism as "the sum of all the chemical and physical changes that take place within the body and enable its continued growth and functioning."[3] In short, everything happening to keep us alive. Thus we can conclude that analysing metabolic efficiency is as good a place as any to begin evaluating health.

It turns out movement plays an integral role in metabolic efficiency and once again it is Ida Rolf who highlights this connection: "metabolism conveys the idea of basic underlying foodstuffs (metabolites) carried into the cell itself, and of waste products removed at the same depth... Muscles are important pumping mechanisms for this process."[1]

Naturally, a byproduct of muscles pumping is movement; as elucidated by the late Dr. Moshe Feldenkrais: "all movement and change of position originating in the body are produced by muscular pull or relaxation."[4]

Crucially this process can also be reverse engineered. It is the pumping action of rhythmic movement (the oscillation between muscular contraction and relaxation) that draws in nourishment and flushes out waste products; thus promoting metabolic efficiency. Don't be quick to heap praise on the muscles just yet however; as we shall see later, despite their being indispensable there is quite literally more to the story than meets the eye.

A terrific example of the consequences of immobility can be seen in the side affects of wearing the hard cast traditionally prescribed for a broken bone. Absolute immobility of the entire region of a break for 4 to 6 weeks may help the bone knit; but inadvertently bears huge consequences for the metabolism of the formerly undamaged tissues in the surrounding area. Fortunately doctors are catching onto this and hard casts are increasingly becoming a thing of the past.

Movement is nourishment. It's emerged as the very thing that keeps us healthy and vital; which is a good thing because as we've seen movement is a constant in life and can't be avoided. However, unsurprisingly there is more to the story than that. All forms of movement are not equal and we must dig deeper into the nature of how we move about our gravity bound environment here on Earth to differentiate better from worse.

Nicholai Bernstein was a Russian neurophysiologist who, like his country at the time, was particularly productive throughout the first half of the 20th century. After Bernstein's death in 1966 a collection of his essays were published that challenged the established theories of motor (movement) development in vogue at the time. Bernstein summarised the foundation of his theory of movement development as "repetition without repetition."[5] Whilst that hardly conveys any meaning at all, Bernstein's theory isn't extraordinarily complicated.

In a commentary on Bernstein's *On Dexterity and it's Development,* the late Dr. Edward S Reed succinctly explained why Bernstein was of the opinion that it is impossible for any two movements to be identical: "Bernstein's (theory) always emphasised that absolute repetition of a movement pattern is not possible because of the inherent variability and complexity of the environment."[5]

It appears that the constant motion inherent in each of us is also a quality inherently shared by the environment as well.

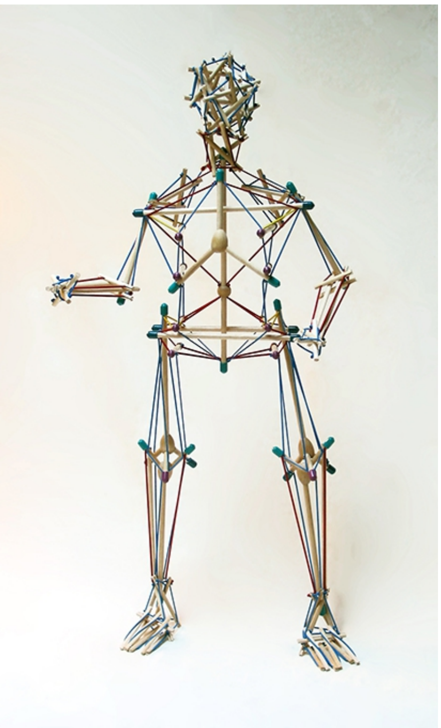
As a result, through repetition it is not a particular movement that we master, rather the process by which we perform the movement. The process utilised to execute a movement will necessarily have to be adapted in accordance with the ecological conditions prevailing at the time. To put it another way, we must constantly adapt our movements so they appropriately match the environment in the moment they are made.

The fact that **no two movements are alike** is a fundamental quality of human movement; however it doesn't reveal much about the body doing the moving. Naturally, it is to art that we must turn to begin painting our picture of understanding. In the mid twentieth century a contemporary American sculptor Kenneth Snelson began constructing works of art that unknowingly solved the mystery surrounding how man remains structurally sound whilst adopting his unique upright posture.[6] Snelson's structures were composed of two interdependent elements: rigid beams subjected to a compressional force, and guy ropes providing a tensional force.

Crucially, Snelson's creations are not structurally sound due to compression as the beams do not come into direct contact with one another. Rather it is the **balanced tension** of the guy ropes that **facilitates integrity** and provides for a unique combination of both stability and flexibility. Another of Snelson's countryman, Buckminster Fuller, coined the term that is now universally applied to a structure of this kind: "tensegrity." A portmanteau of "tension" and "integrity."

It took 3 decades for the concept of tensegrity to permeate its way into the sphere of biology (living things). It did so in 1981, when Dr. Stephen Levin demonstrated that the principle of tensegrity was solely responsible for structurally defining all organisms on planet Earth "from viruses to vertebrates."[7]

In terms of the composition of the human body as it applies to movement, tensegrity (or biotensegrity when in the context of the living form) is without question the principle that defines them all. It provides us with an explanation for how the human body can maintain its structural integrity whilst performing all manner of mind-bending dynamic movements. It reversed "the centuries-old concept that the skeleton is the frame upon which the soft tissue is draped,"[7] which implies that it is the compression of the bones stacking upon one another that is alone responsible for our upright integrity.



Putting the principle into practice: a tensegrity model of the human form inspired by the work of Kenneth Snelson.

The wooden dowels represent our bones and the elastic bands our fascial tissue web with embedded muscle tissue.

When the tension is balanced, optimal structural integrity and good health ensues. When it isn't, deficiency and dysfunction emerge.

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Bringing the principle to life: a computer generated representation of the fascial tissue web that defines all of us.

It acts as the medium that houses all of our bodily systems. Not least of which the musculature providing the tension and the skeletal system undergoing compression.

Image is the work of Dr. Robert Schleip.

If the bones don't stack, what happens? The body is a liquid medium so they float of course; along with everything else in a sea of balanced tension. The compressional side of the equation manifests itself anatomically as bone in the human body, and it is the muscles that account for the complementary tension. However, bone together with muscle fails to produce an upright human body; just the two of them would result in a formless pile of tissue. The anatomical element that completes the circuit is known as our "fascial tissue web," to which muscles and bone are merely members of the supporting cast; indispensable members however.

Our fascial tissue web can be thought of as a three dimensional spider's web composed of fibrous sheets of tissue woven from collagen, known as fascia. In it there are pockets and compartments that house both the skeletal and muscular systems. Thus the muscles, providing the tension, and the bones, entering into compression, are embedded within our fascial tissue web. It is the fascial tissue web that mediates the interaction of these interdependent forces and is responsible for distributing and balancing the tension produced by the muscles as they contract. Based on this we can conclude that **from a movement perspective, of all the tissues in the human body it is the fascial tissue web that is of the highest importance.**

From this two important implications for movement emerge: one pertaining to how the fascial tissue web is organised and another to how our mind makes use of our muscles (or tensional members to cast them in the light of their structural purpose).

Whilst the sheaths that comprise the fascial tissue web create vast numbers of pockets and compartments, the pockets and compartments themselves are arranged into layers of varying depth. The most superficial of our layers is of course the skin and from there we dive inward to the depths, one layer at a time. Optimal movement, which as we've seen above is synonymous with optimal health, relies upon each layer being able to freely glide on top of or beneath its neighbour. In the event that adhesions between layers prevent free gliding, stillness emerges and our freedom of movement becomes restricted.

Fortunately there are ways in which we may intervene. Dr. Gil Hedley has articulated the remedy for this pathological lack of differentiation between layers and therefore the restoration of health: "Regardless of what the ultimate cause of an abnormal (tissue) adhesion may be, the cure is always the same: Introduce movement where there is stillness; either on your own, or with help.”[8] Thus, **we must move in ways that challenge existing adhesions between tissue layers and/or promote the continued differentiation of layers.** Optimal tissue differentiation also plays an important role in coordination as it facilitates the smooth and progressive sequential firing of motor units that is characteristic of graceful movement.

The second implication the fascial tissue web has for movement relates to the muscles embedded within the web rather than the web itself. As the saying goes, appearances can be deceiving; and when it comes to the human body it turns out that in fact they are. The emergence of bodybuilding in the 20th century has lead to a modern day lust for a well-developed, sculpted physique. A consequence of admiring well-developed biceps, pecs and calves is that we’ve come to believe that these muscles operate the way they present; as whole units. Therein lies the deceit.

There are approximately 320 mirrored pairs of muscles in the human body which according to your brain means absolutely nothing whatsoever. Your brain doesn’t know muscles; it knows “motor units.”[9] A motor unit simply refers to the nerve that delivers a movement command and the few hundred muscle fibres that execute it. The musculature of the body is broken up into millions of these motor units and it is the coordinated firing of individual units, not whole muscles, that produces human movement. The importance of optimal tissue differentiation again comes into play. Each and every motor unit must be differentiated from its neighbours so that it may be individually recruited when required.

In the language of the brain there is “one muscle, many compartments”.[10] A single tensional force that can be utilised in millions of different ways. **Whole muscles are not functional units.**[9]

Hopefully by now the vital importance of movement has been established and there is ample motivation to mobilise. To further refine our understanding of movement we must naturally look to our inner child. Our brain is the core processing unit of a continuous, unbroken nervous system and within it there exists regions that our entire body is mapped onto. Several of these physical representations can be identified and each one is known as a homunculus; “little man” in latin.[11] The brain is only able to make use of something it’s aware of; which is to say something that forms apart of our homunculi.

Like our muscular and skeletal systems, our nervous system is also embedded within our fascial tissue web and sensory nerve endings pervade effectively every micron of it. These receptors constantly monitor the functioning of our system as we move and transmit information back to the centre for processing. The impact this has for movement is both obvious and rather practical. **It’s imperative that we vary our movements to engage each and every fibre of our fascial tissue web**; so ensuring that our body is as comprehensively mapped onto the brain as possible. Once our sensory neural pathways have completed their cartography, our motor (movement) centres are able to instinctively harness what’s available to them. With more options available in terms of tissue recruitment, coordination may heighten and movement becomes more refined and elegant.

Refined coordination best describes the elegant use of one’s body, and it’s not solely based on comprehensive homunculi. Coordination is a product of two motor control processes: feedforward and feedback.[12] Movements made using the feedforward process are characterised by the speed with which they are required to take place. If external stimuli must be dealt with instantly, insufficient time exists for sensory input to be fed back to the centre and influence the execution of a movement (a feedback process). In such an instance, an anticipatory command must be made.

Unlike feedback motor control, feedforward control has access to our memory; or to put it another way, access to what has been learnt from past experience. During feedforward movements we harness the results of past experience to accurately anticipate what is required to successfully respond to external stimuli in the present. Once the response is executed, the feedback control process relays a summary of what took place for input processing. Once processed it is stored alongside other pieces of feedback information from prior experience of a similar nature. This process results in an expansion of the body of knowledge that is drawn upon when the next anticipatory command is made, refining the resulting movement so that it appears more coordinated and elegant.

Whilst both feedforward and feedback processes often work in concert to produce movement, it is our feedback process that is responsible for producing the vast majority of ordinary movements made during everyday life. As a result the proficiency of our feedback process can exceed that of its partner. **Ideally we should move in ways that intentionally exercise our feedforward motor command** to ensure that when called upon it enhances refined coordination; both in isolation and in conjunction with its feedback counterpart.

What was once exercise has become movement. And what was once done for looks is now done for health. Yet don’t dismay; this doesn’t mean you’ve lost all forms of aesthetic self-respect. If you embrace the aforementioned principles and move to enhance your health, not only will you do the right thing by your body, and your mind, I guarantee you’ll also love the way you look. Who says you can’t have your cake and eat it too?

Heath Wiechman has these principles to thank for the restoration of his health. Although they don't single-handedly deserve all the credit. Rolfing set the layers differentiating, and when movement of his own isn't enough to keep the wheels in motion, he continues to turn to Rolfing for help. Others are also beginning to turn to Rolfing for help. In fact they are turning to Heath specifically as he now runs a Rolfing practice of his own:

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